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I wish here to thank Mr. K. L. Skinner for his kindness in sending me a description of the set of eggs in his collection, Mr. R. C. Harlow, who has kindly helped me in the same way, and Mr. A. O. Treganza for the loan of specimens.

Claremont, California, February 7, 1921.

WEIGHTS AND PLUMAGE OF DUCKS IN THE RIO GRANDE VALLEY

By ALDO LEOPOLD

SINCE 1917 I have recorded the weights of about 300 ducks of fifteen species killed during the open season in the Rio Grande Valley between Socorro and Albuquerque, New Mexico. These weights, all plotted as colored points (one color representing each species) on coördinates of time in weeks and weight in pounds, respectively, give an interesting one-page graphic record of seasonal weight changes, maximum and minimum weights, comparative weights of species, seasonal abundance of species, and comparative abundance of species. It is impracticable to publish the colored graph, but the following data obtained from the graph, and questions and conclusions suggested by it, may be of interest.¹

TABLE OF WEIGHTS IN POUNDS

Species	No.	Maximum		Minimum	
		Extreme	General	Extreme ²	General
Mallard	101	3.30	3.00	1.75	2.00
Black Mallard	12	2.80	.....	2.20	.....
Pintail	33	2.37	2.10	1.30	1.50
Widgeon	33	2.63(?)	1.75	1.15	1.30
Gadwall	9	2.00	1.90	1.13	.....
Green-wing Teal	42	.82	.....	.50	.....
Blue-wing Teal	13	.90	.....	.56	.....
Spoonbill	37	1.69	1.50	.95	1.00
Canvas-back	7	2.63	.....	1.90	.....
Redhead	3	2.05	.....	1.50	.....
Bluebill (both sp.).....	4	1.50	.....	1.13	.....
Bufflehead	4	1.00	.....	.75	.....
Ruddy Duck	4	1.13	.....	.90	.....

The graph shows that Mallards attain their greatest weight in early November and decline slightly but steadily during December and January. Pintails stay about stationary, while Gadwalls and especially Widgeons increase steadily throughout the season. I know of nothing in their respective food habits to account for this. It suggests the possibility that weight may increase with maturity of plumage, more or less independently of food supply and food habits, it being a manifest fact, known to every hunter, that Mallards in this region attain nearly full maturity of plumage in November, while the other three do not show full feather until the middle of the winter. Spoonbills and Teals seem to decrease in

¹Some preliminary "Notes on the Weights and Plumage of Ducks in New Mexico" were published in the Condor, XXI, May, 1919, pp. 128-129.

²These extreme minimum weights should be accepted with reservations because of the possibility of the figures containing crippled birds. No cripples were knowingly included, but occasionally even an active and apparently healthy bird has sustained wounds which may have affected its weight.

weight after November, but the number of late birds weighed is too small to be reliable.

In my previous notes I called attention to the varying weights and plumages of Mallards brought down by successive storms, and ascribed the flights of light, immature birds, which often follow heavy mature birds, to late northerly hatchings and long travel. Subsequent observations show no evidence to controvert this as to Mallards. But I now suspect that various breeding grounds, regardless of latitude, produce ducks of widely varying weights and plumages. Albuquerque Canvas-backs and Red-heads, for instance, weigh right around two pounds throughout the open season; and both species, though fat, nearly always show a very dull color and peculiarly frazzled plumage. Reliable hunters inform me, however, that the Canvas-backs of Lake Burford, in northern New Mexico, even on the opening day (October 16), are always big, heavy, bright-colored birds weighing up to four pounds. I doubt the four pounds, but everybody seems to agree that they are bigger and heavier in October than the ones shot at Albuquerque at any season. I have also heard sportsmen from the northern Rocky Mountain states talk about "big and little cans". I conclude that Lake Burford and Albuquerque are on different migration routes and draw their Canvas-backs from different breeding grounds producing differently developed birds.

The theory that weights vary with breeding grounds is corroborated by the small range of weight exhibited by Black Mallards (species not yet agreed upon by taxonomists), most of which are probably raised here in the Southwest, as compared with the great range of weight exhibited by ordinary Mallards, which are probably drawn from many breeding grounds extending from here to the far north. The graph shows the average weights of the two species to be about the same, but the spread of the dots for the latter species is twice that of the first.

The graph shows the maximum abundance of Pintails to be in October and January, with very few in November and December. These January Pintails are return flights during the January thaws, and during 1920 at least these return birds were nearly all full plumaged males. Every year males preponderate in these return Pintails. The graph shows that Blue-wing Teal are all gone by November 1, but a few Green-wings winter. Spoonbills mostly leave by December 15. Gadwalls show some tendency to be more abundant in October and January than in November. Mallards, of course, stay, but are least abundant in December.

A preliminary table showing relative abundance of species, based on two years' kill (1917 and 1918) has already been published². The same method, applied to four years kill, 1917-1920, gives the following corrected table: Mallard 30 percent; Green-wing Teal, 15; Pintail, 12; Baldpate, 11; Spoonbill, 10; Mergansers, 5; Black Mallard (sp.?), 4; Blue-wing Teal, 4; Gadwall, 3; Canvas-back, 2; Redhead, Bluebill, Bufflehead, Ruddy and Golden-eye, 4.

Albuquerque, New Mexico, March 4, 1921.

²Relative Abundance of Ducks in the Rio Grande Valley, Condor, XXI, May, 1919 p. 122.